The Slowdown in GDP Growth: Decomposition and Some Implications

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Social Security TPAM
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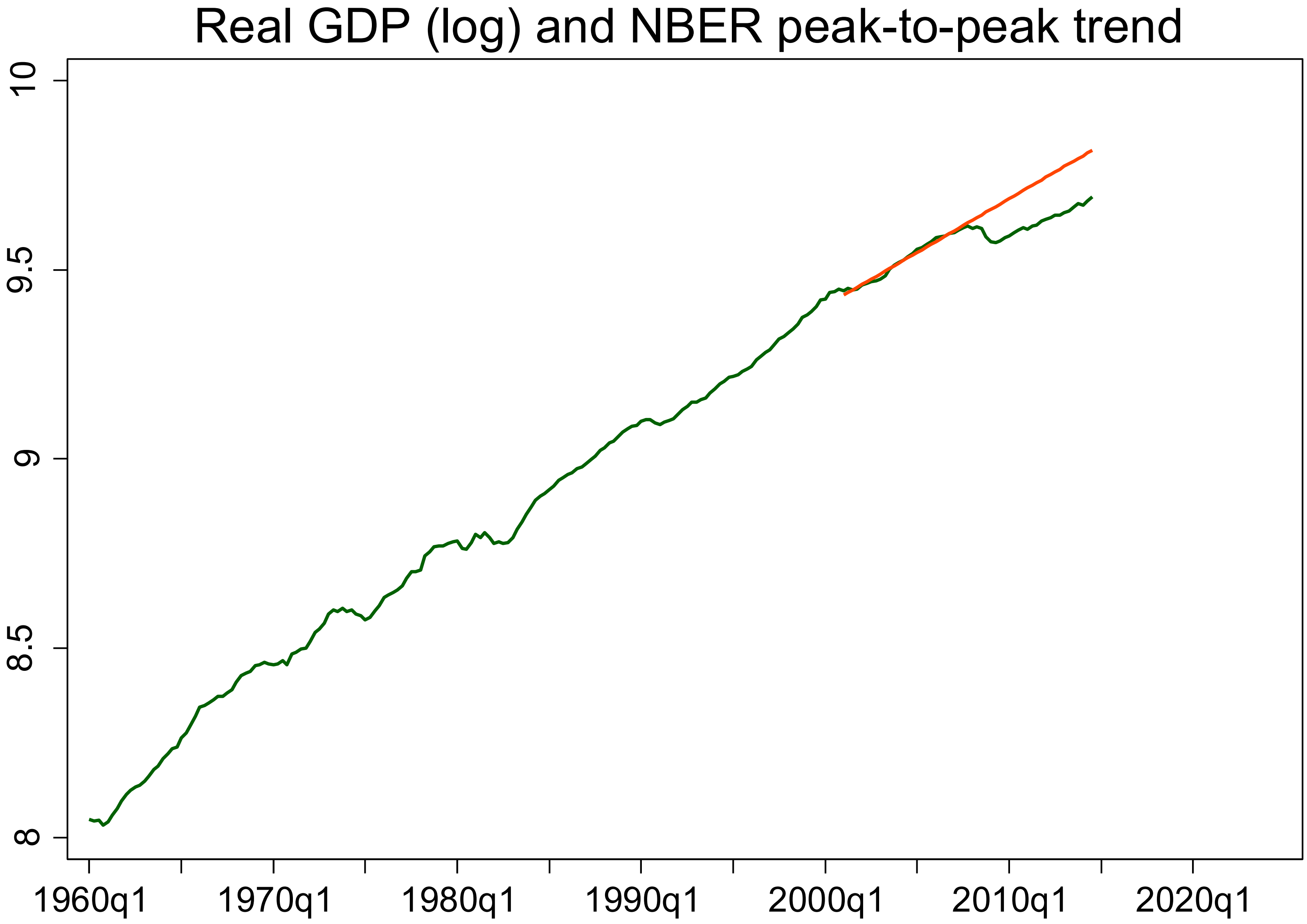
Is the Growth Slowdown New – I



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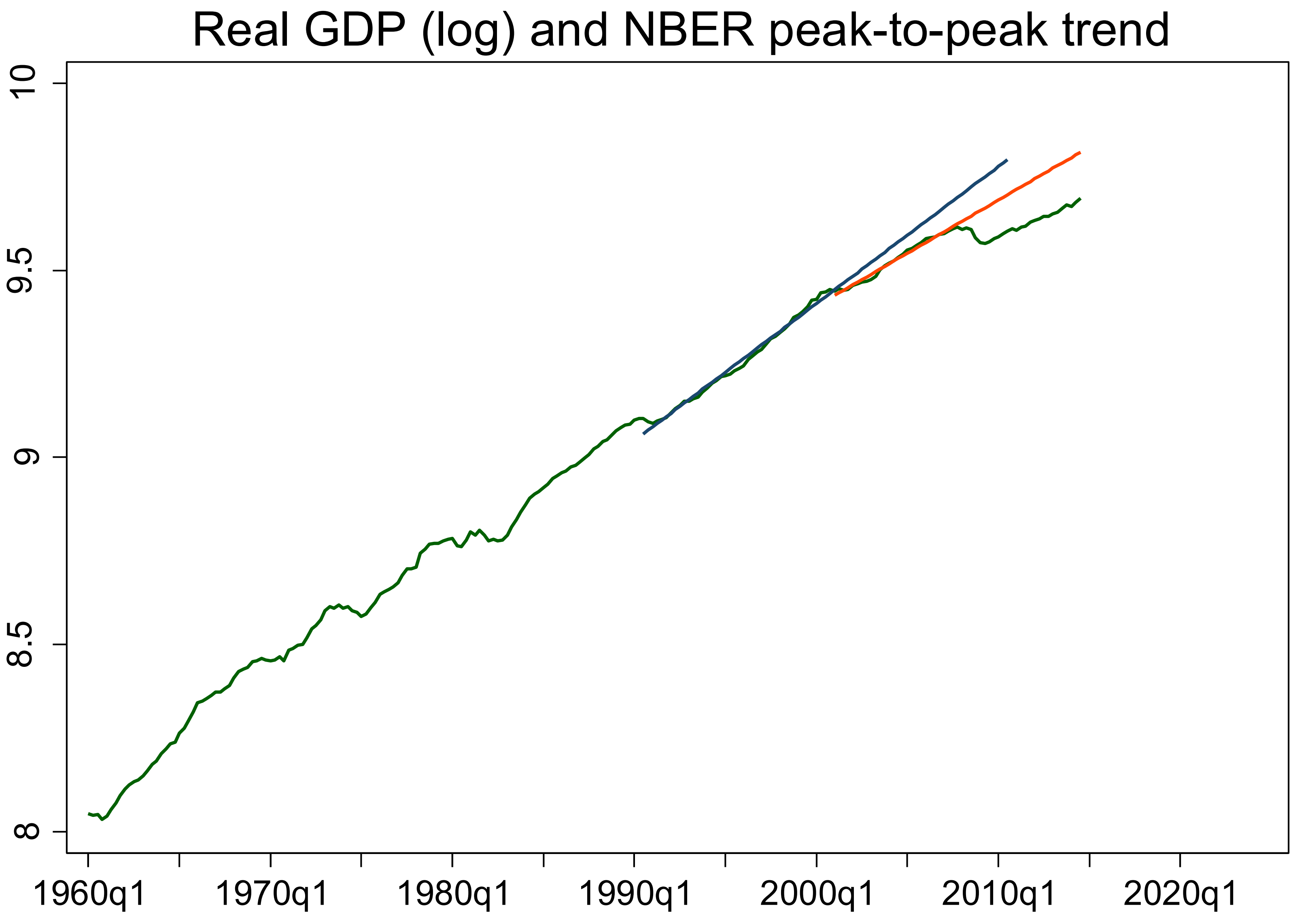

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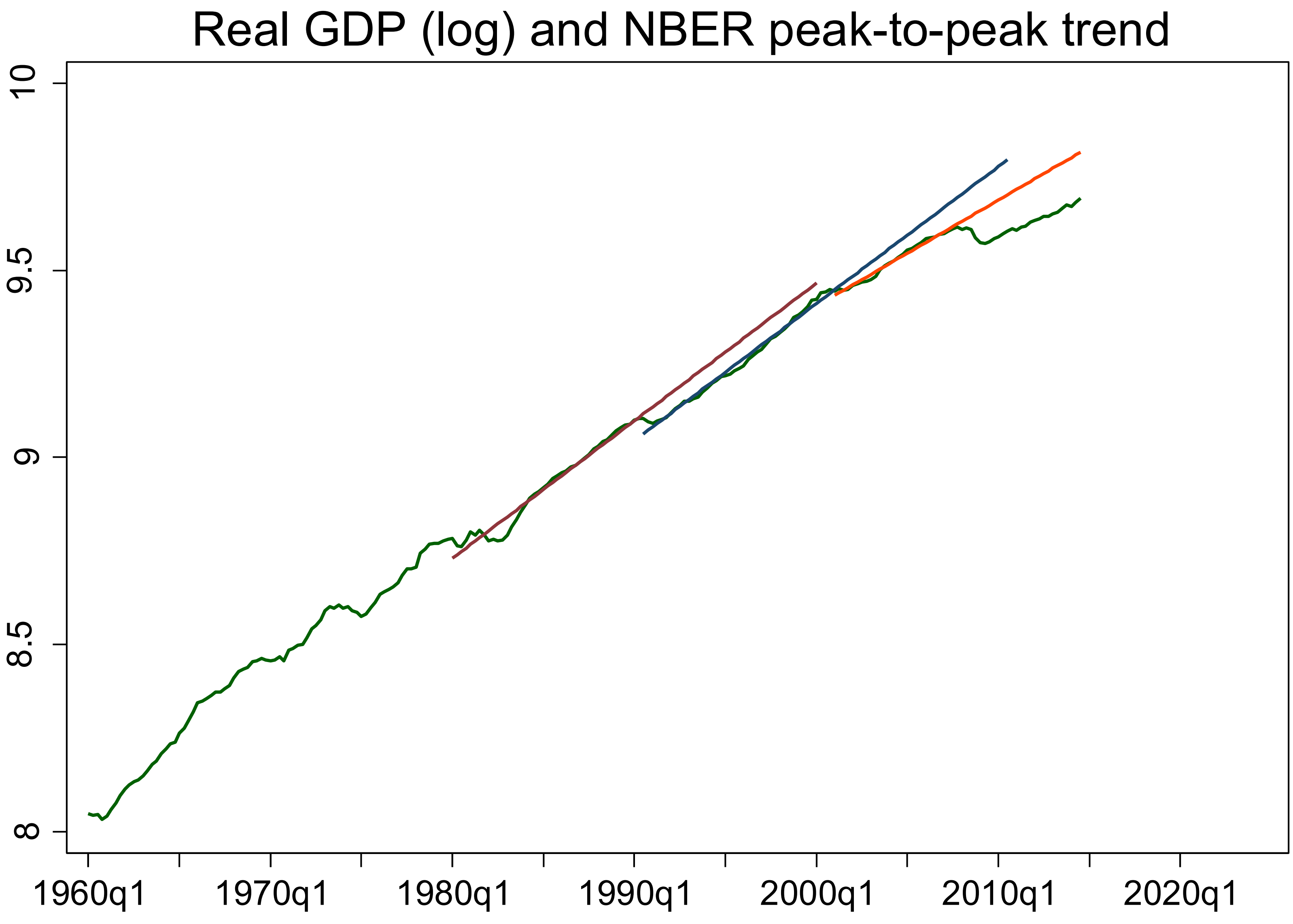

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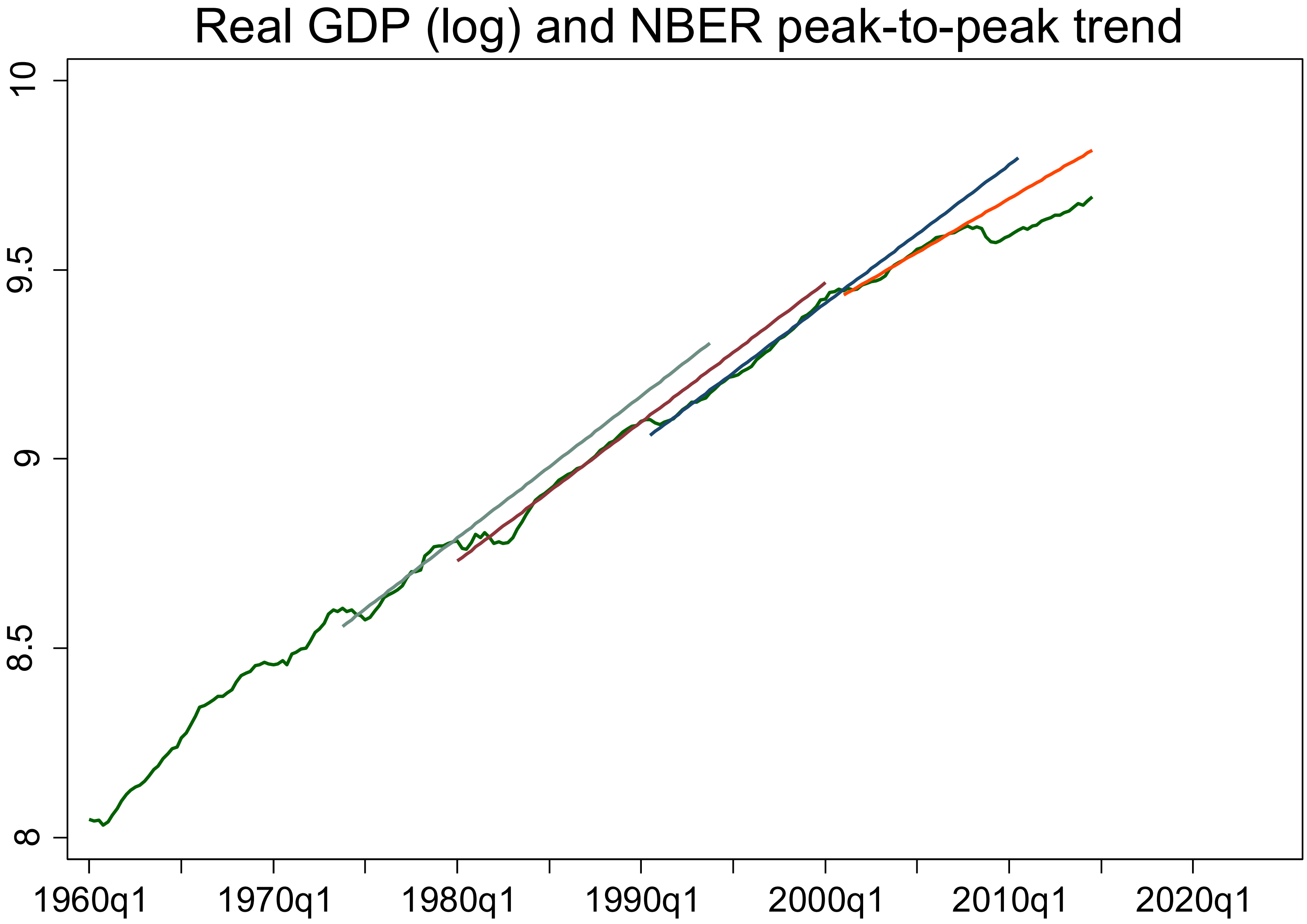

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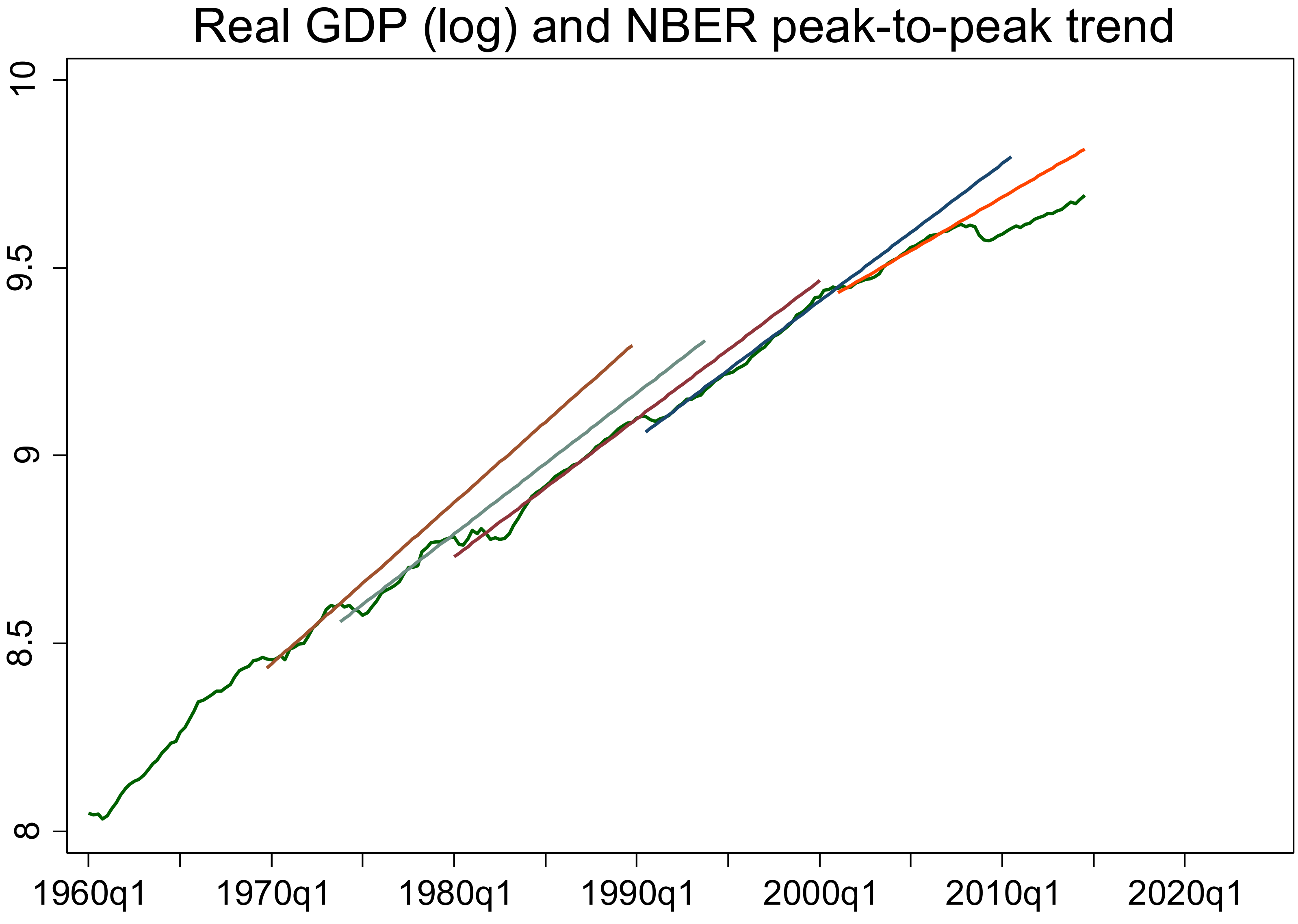

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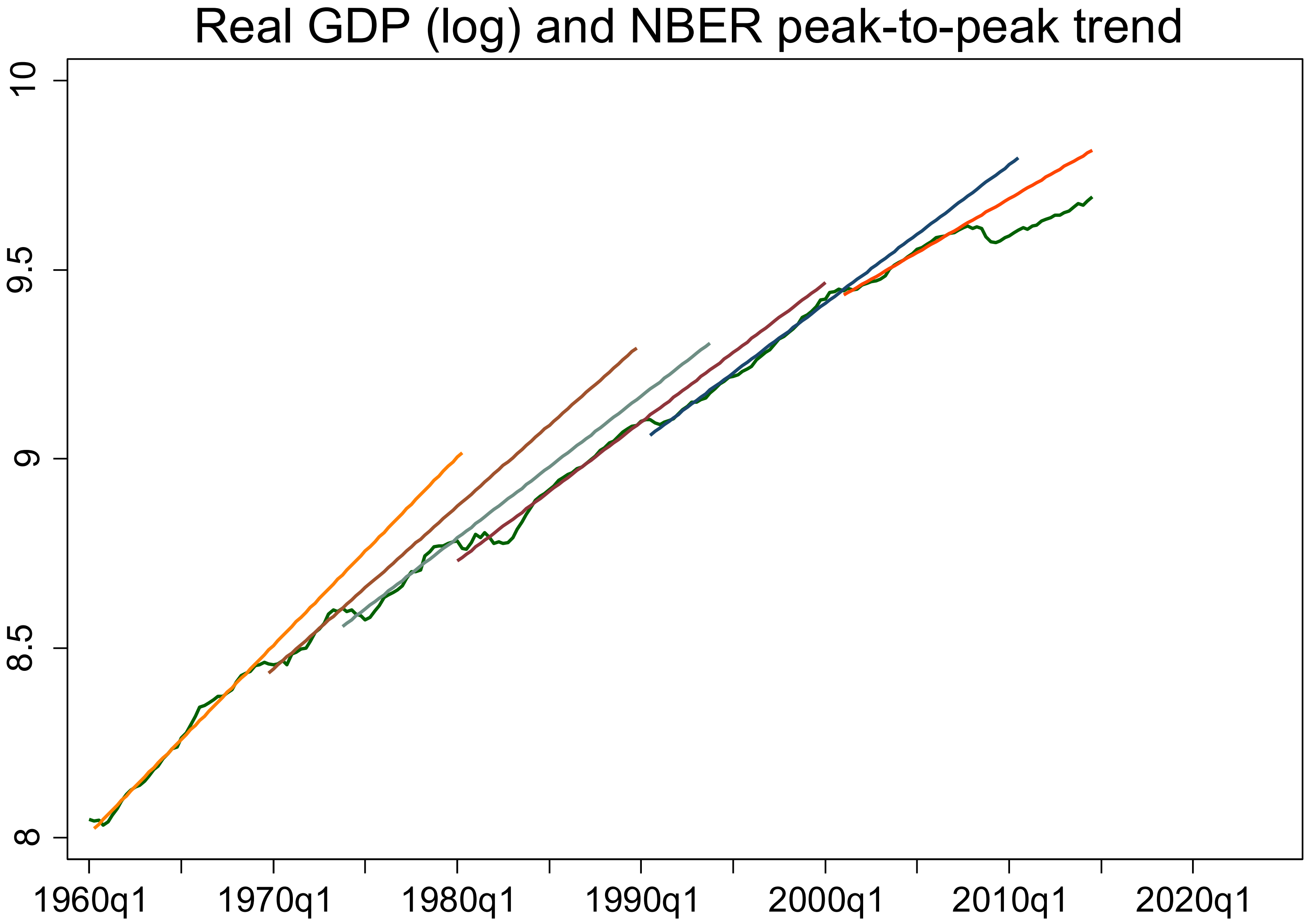
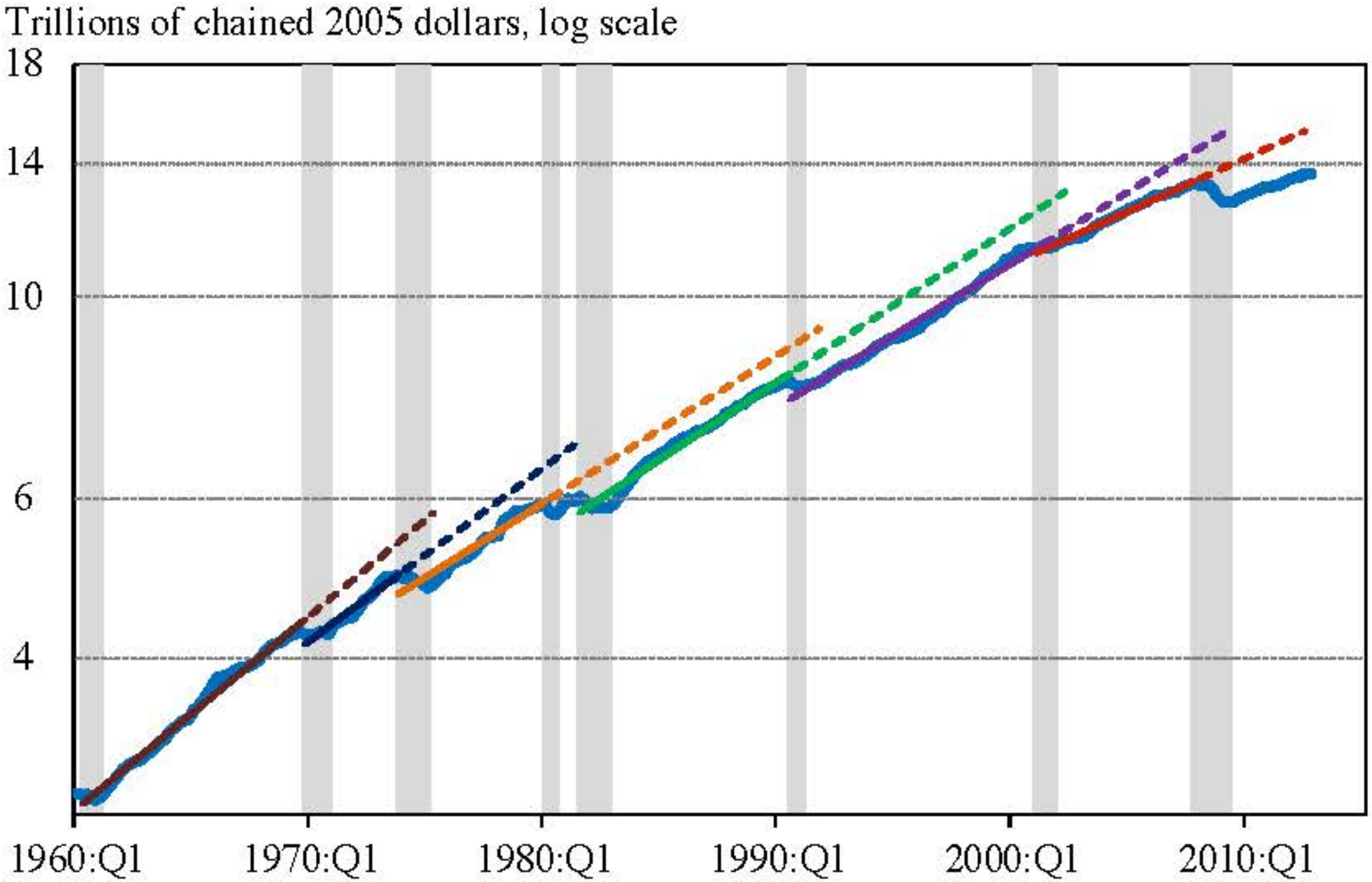


Is the Growth Slowdown New – I

Figure 1-2

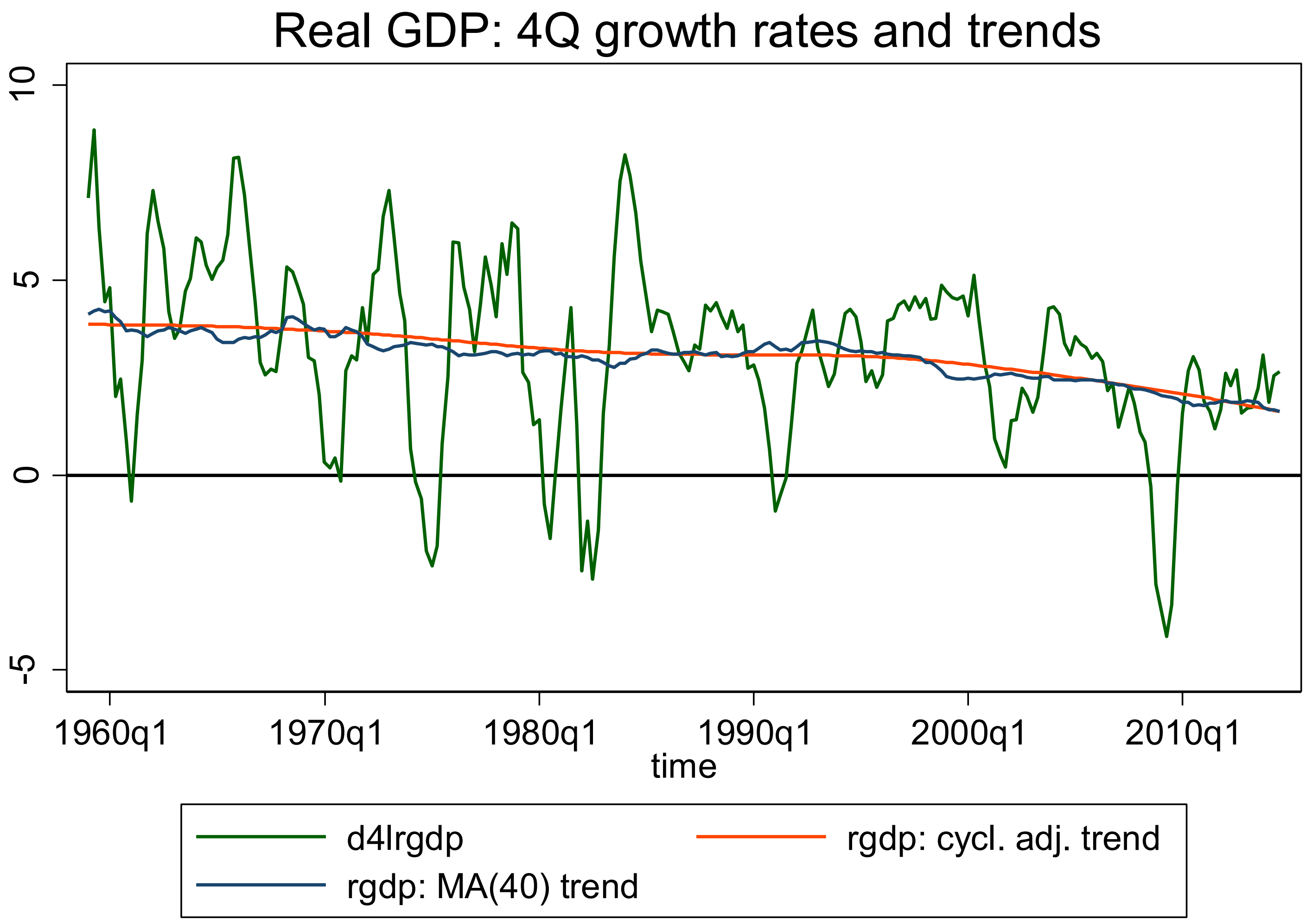
Real Gross Domestic Product and Trends, 1960–2012



Note: Shading denotes recession. Trend lines represent the average growth rate between successive business-cycle peaks.
Source: Bureau of Economic Analysis, National Income and Product Accounts; National Bureau of Economic Research; CEA calculations.

Source: *Economic Report of the President* (2013)

Is the Growth Slowdown New – II



Trend GDP growth	
1965	3.8%
1975	3.5%
1985	3.1%
1995	3.0%
2005	2.5%
2010	2.1%

Methods, Part I: Supply-Side Decomposition

Selected references on aspects of the GDP slowdown

Aaronson, S. et. al., *BPEA* (2006) (on LFPR)
Aaronson, S. et. al., *BPEA* (2014) (on LFPR)
Aaronson, D. et. al., Chicago Fed *EP* (2014) (on LFPR)
CBO, *Economic Outlook – Update* (August 2014)
CEA, *Economics Report of the President*, Ch. 2 (2013)
Gordon, *NBER WP 20423* (2014)
Hall, *NBER Macro Annual* (2014)
Stock and Watson, *BPEA* (2012)

Supply side decomposition:

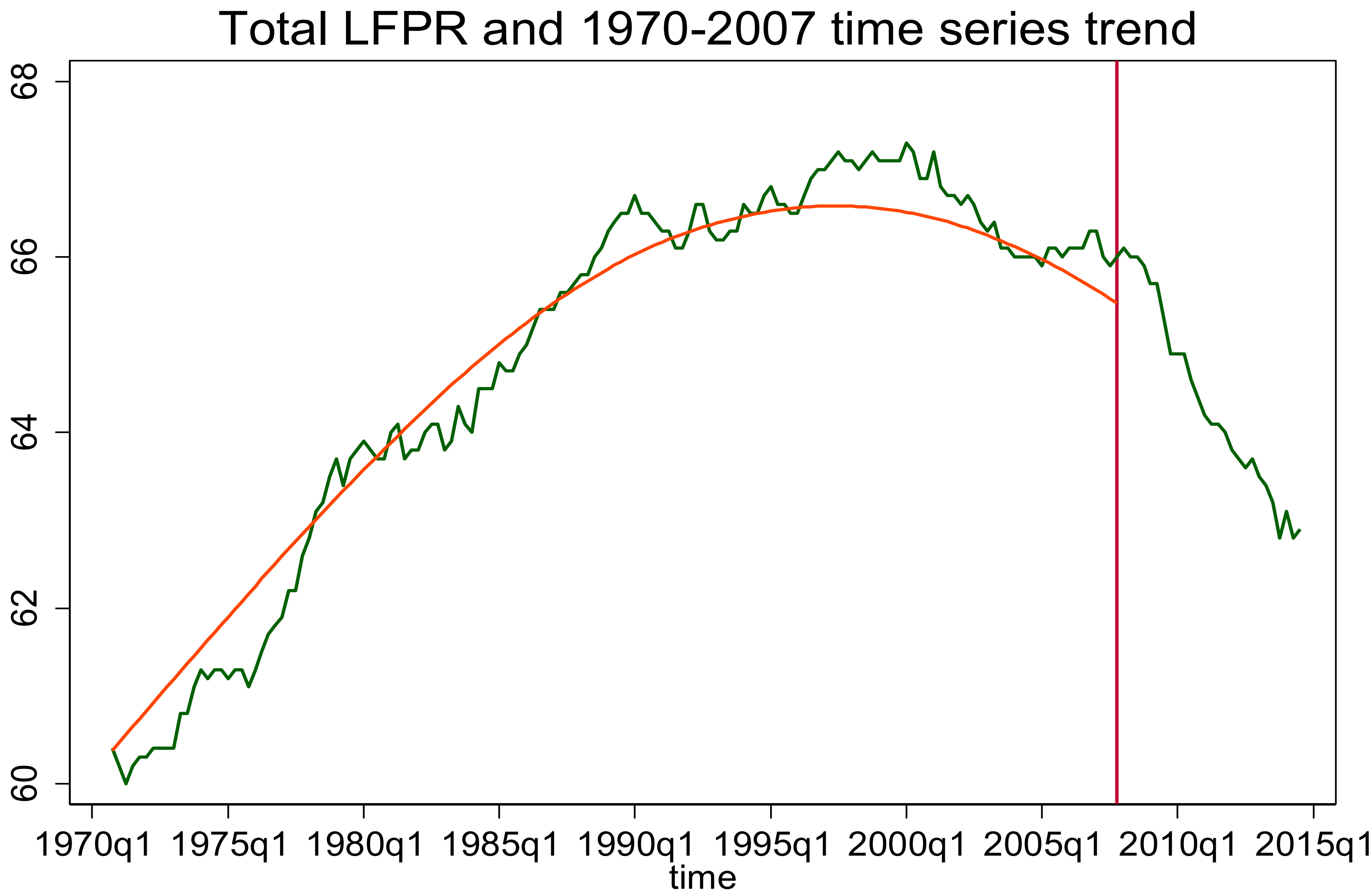
$$GDP_t = \frac{GDP_t}{Hours_t} \times \frac{Hours_t}{Worker_t} \times \frac{Workers_t}{LaborForce_t} \times \frac{LF_t}{Population_t} \times Population$$

In growth rates:

$$\Delta \ln GDP_t = \Delta \ln Productivity_t + \Delta \ln WklyHrs_t + \Delta \ln EmpRate_t + \Delta \ln LFPR_t + \Delta \ln Pop_t$$

Note: *EmpRate* = the employment rate = 1 – unemployment rate, which is almost entirely cyclical – so ignore for this long-run analysis (makes negligible contribution)

Methods, Part II: The End-Point Problem of Trend Estimation



Methods, Part II (ctd.): Estimating Cyclically-Adjusted Trend

Partially linear regression model

Robinson (*Econometrica* 1988), Stock (*JASA* 1989)

Recent theory: Cai [*J. Econometrics* 2007), Zhang and Wu (*A.S.* 2012)

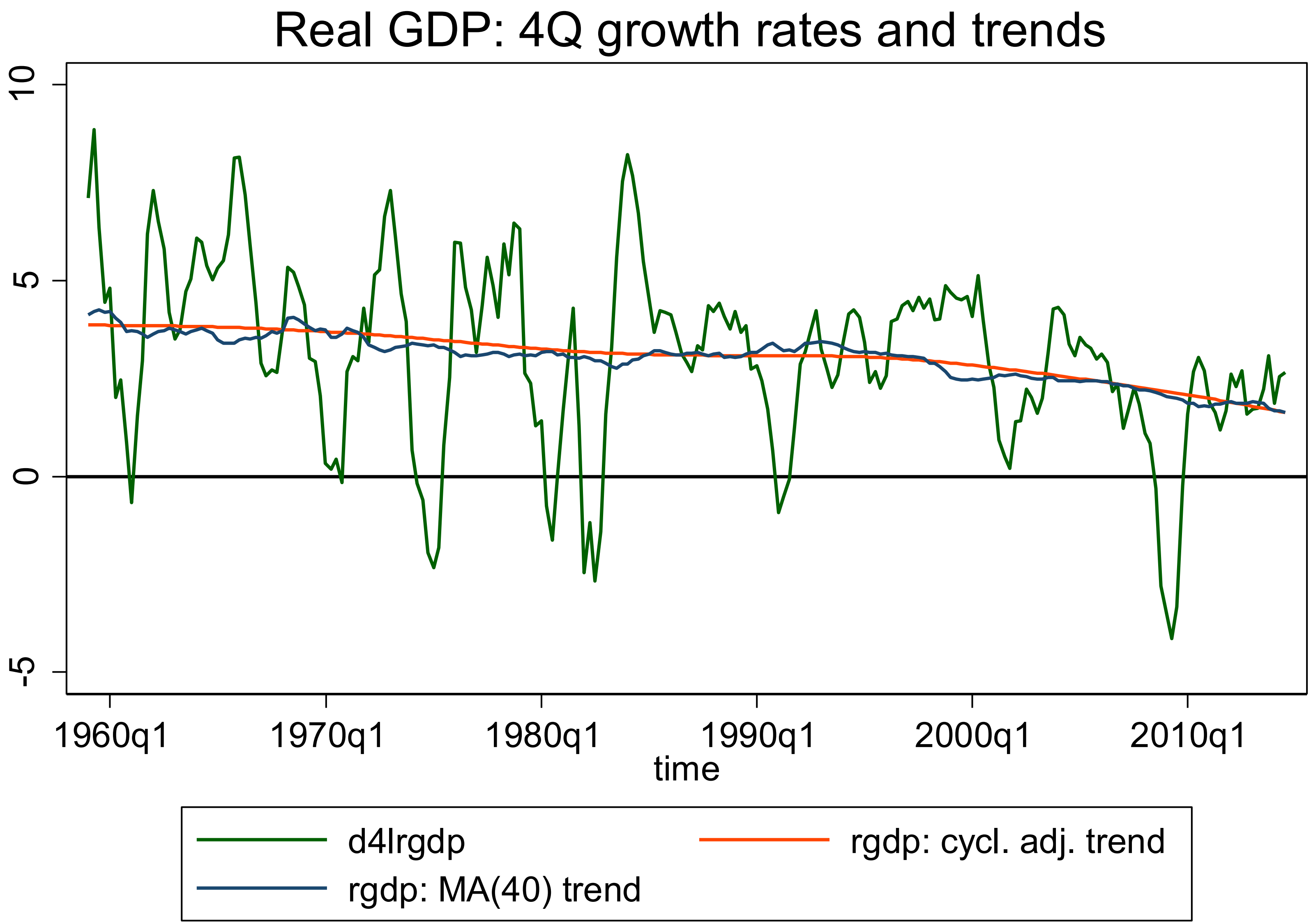
Recent empirical: CEA (2014):

$$LFPR_t = \mu_t + \beta(L)u_t^{gap} + v_t$$

Estimation

- Options for trend:
  - Global polynomial
  - Local polynomial (local linear trend)
  - Kernel smoother (the choice here)
- 2-step kernel estimation of β(L):
  i. Deviate LFPR, u-gap from low-frequency trend (biweight kernel, BW = 40)
  ii. Regress deviated LFPR on deviated u-gap (*t*+2, *t*+1,…, *t*-8)
- Estimate on 1959q1-2007q4 – so cyclical coeffs estimated through 2007q4
- Cyclically adjust LFPR: $LFPR_t - \hat{\beta}(L)u_t^{gap}$
- Smooth the cyclically-adjusted LFPR (biweight kernel)
- Standard errors on cyclical part require adjustment for nonparametric step
- Have done many robust checks, alternative estimators, etc.

$$\Delta \ln GDP_t = \Delta \ln Productivity_t + \Delta \ln WklyHrs_t + \Delta \ln EmpRate_t + \Delta \ln LFPR_t + \Delta \ln Pop_t$$



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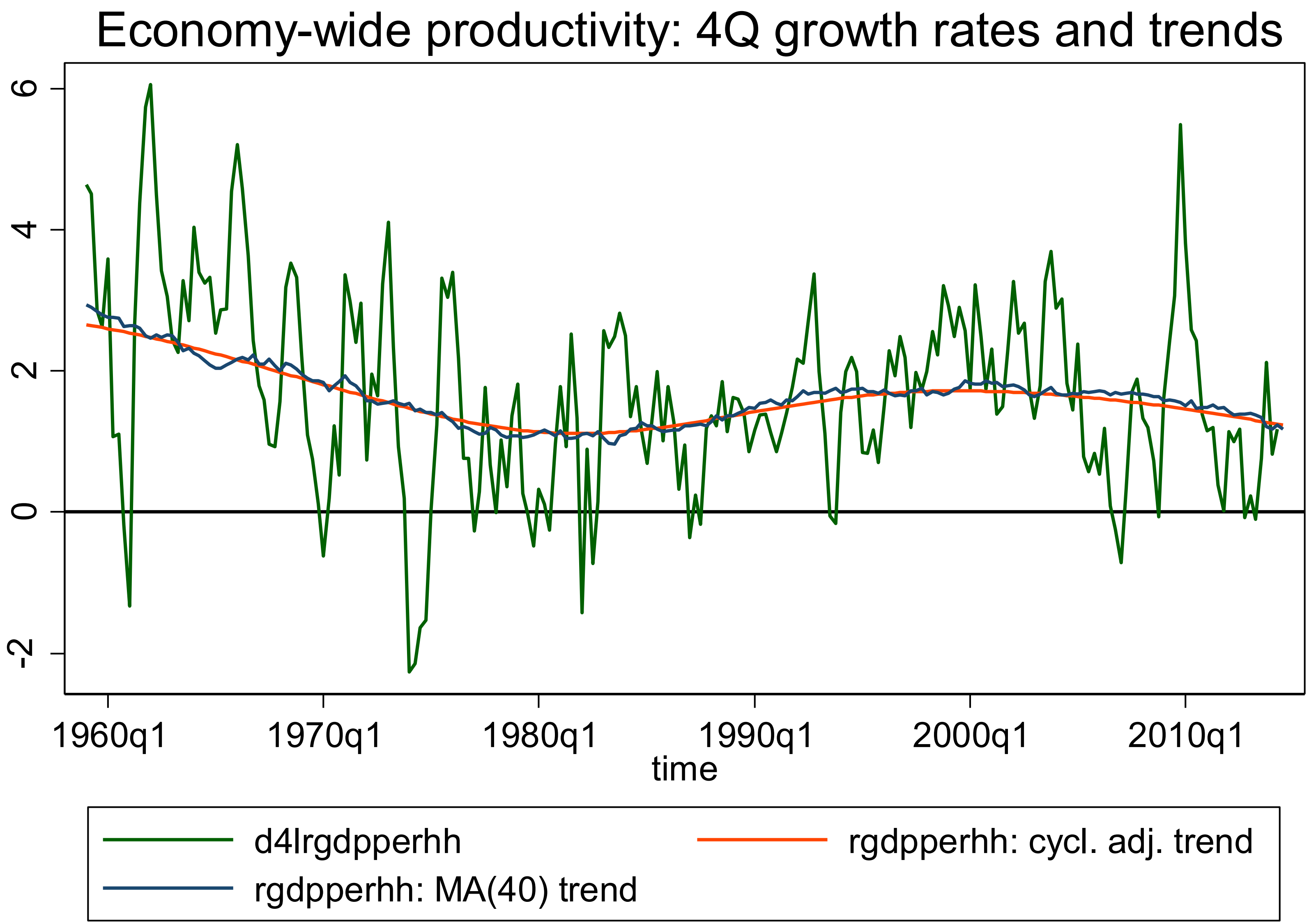
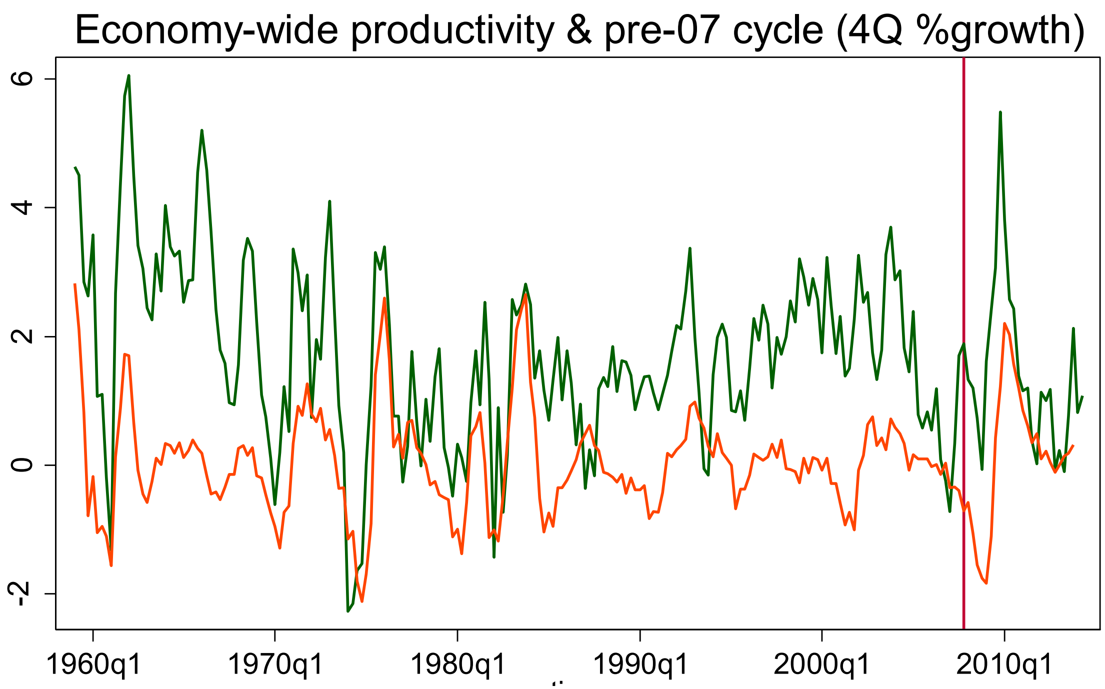
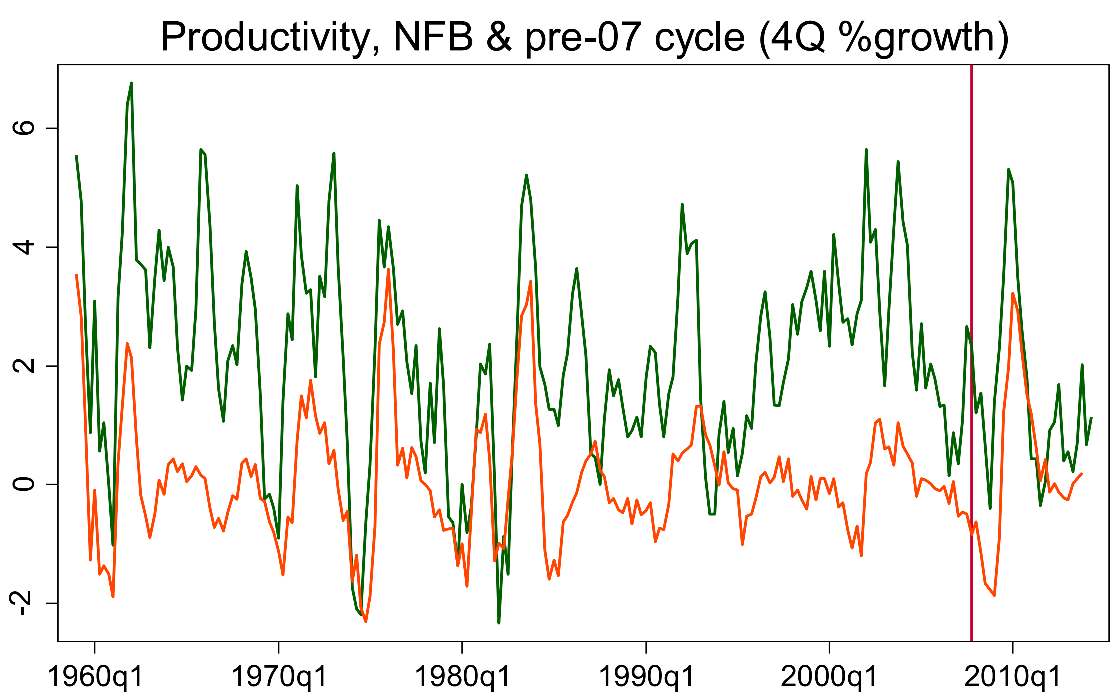


Productivity Slowdown?

- 4-Q % growth and cyclical component
- Economy-wide v. NFB

- The past ~3 years have seen very slow productivity growth
- This is true even after cyclical adjustment
- It is true both for NFB and economy-wide productivity growth
- However, productivity series have a great deal of noise and it is too early to make a firm judgment





Productivity Slowdown?

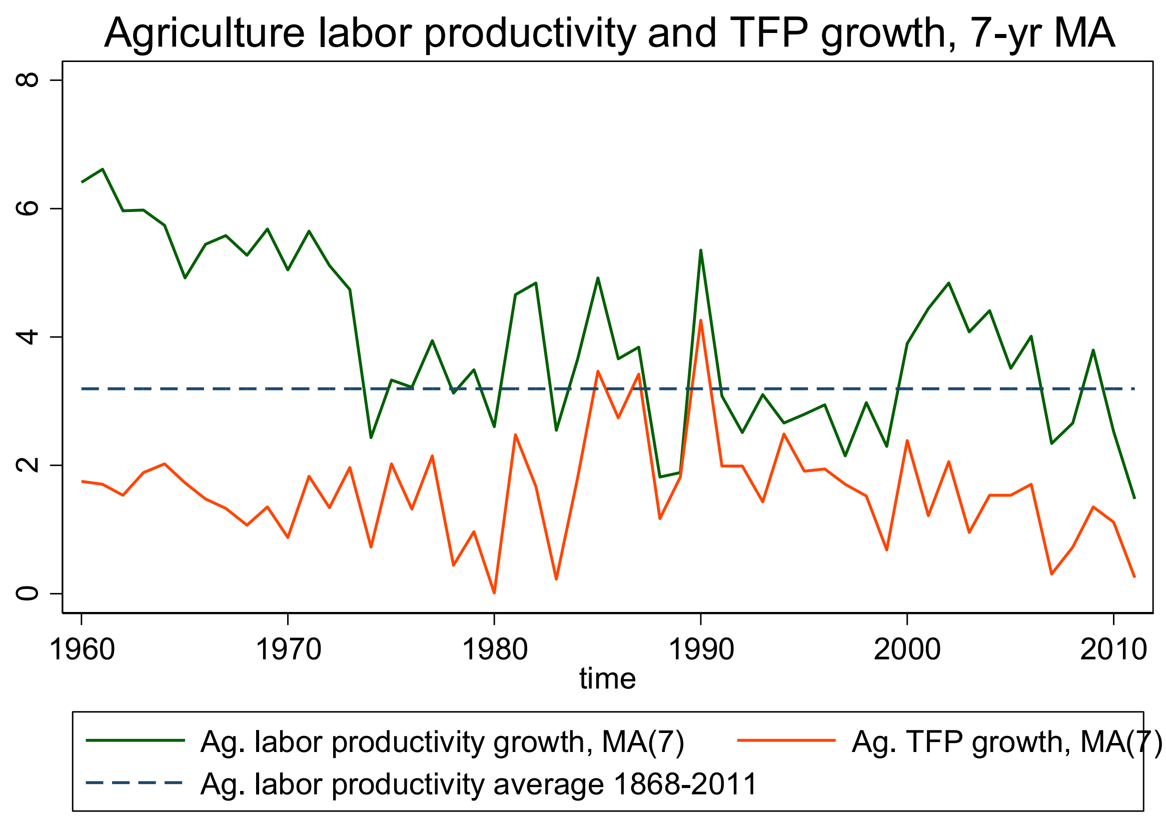
Agricultural Productivity

- Labor productivity growth (7r MA)
- TFP growth (7r MA)
- Labor productivity growth, 1868-2011 (3.2%)

In agriculture:

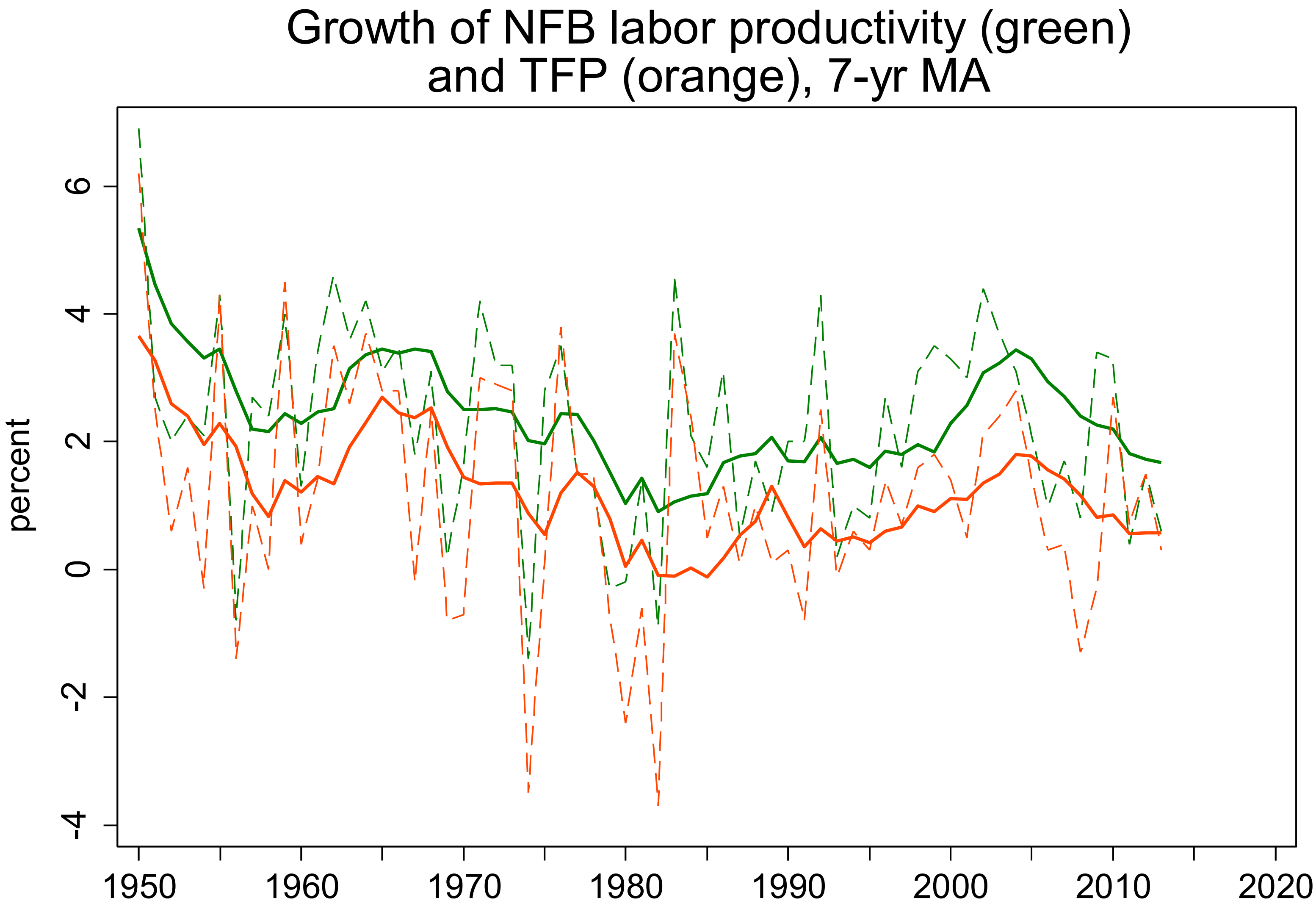
- Outputs and inputs are relatively well-measured
- Little evidence of a labor productivity slowdown
- Or of a TFP slowdown
- In fact, ag. labor productivity growth 1975-present fluctuates around its post-1868 average

1868 3.2% compounded growth: Iowa corn, Parker and Klein (1966), 1870 Census of Mfgrs, BLS, USDA; CEA *ERP* (2014)



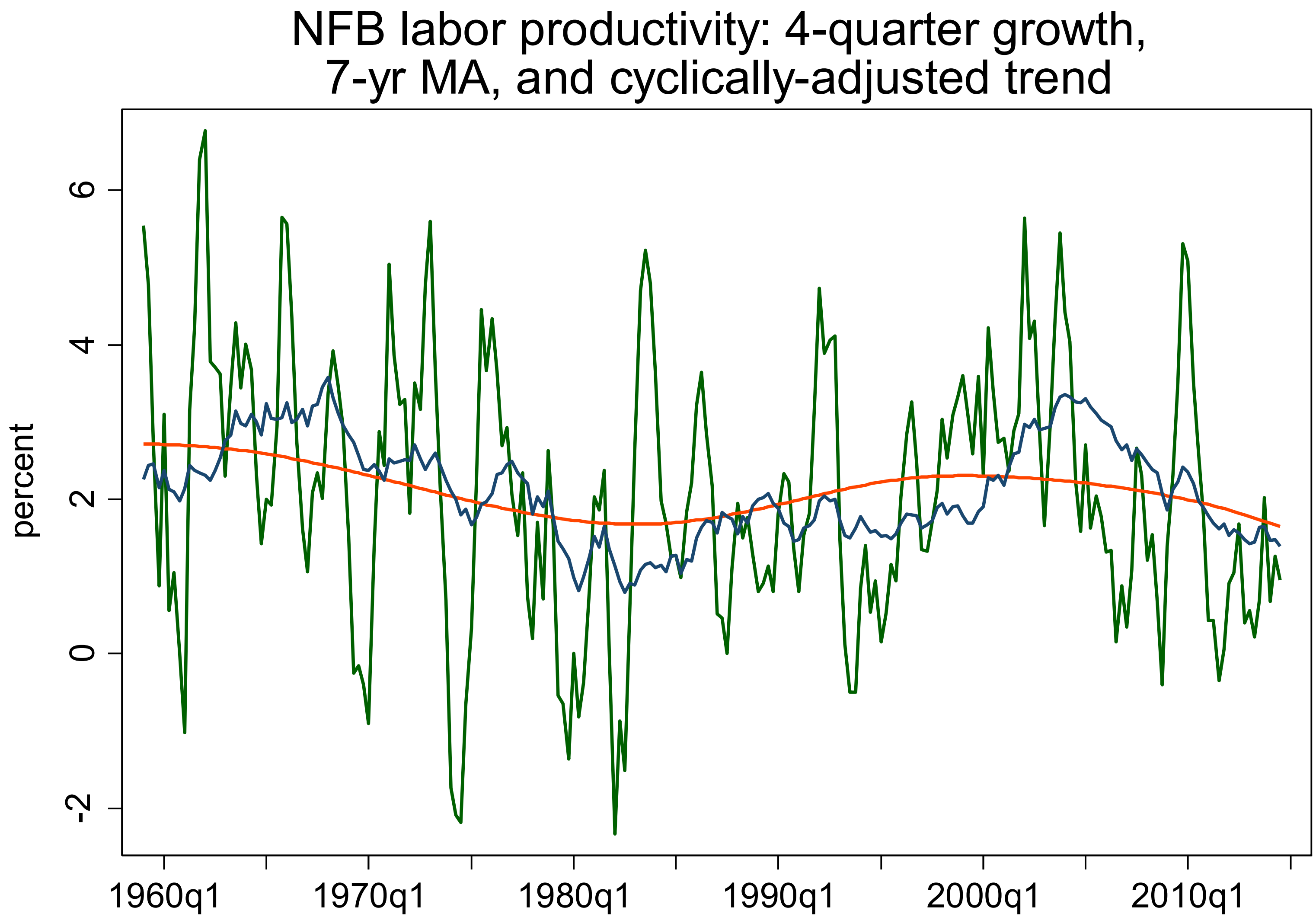
Productivity Slowdown?

- Nonfarm business labor productivity growth (7r MA)
- Nonfarm business MFP growth (7r MA)



Productivity Slowdown?

- 4-quarter nonfarm business labor productivity growth
- Trends: 7-year backwards MA and cyclically-adjusted



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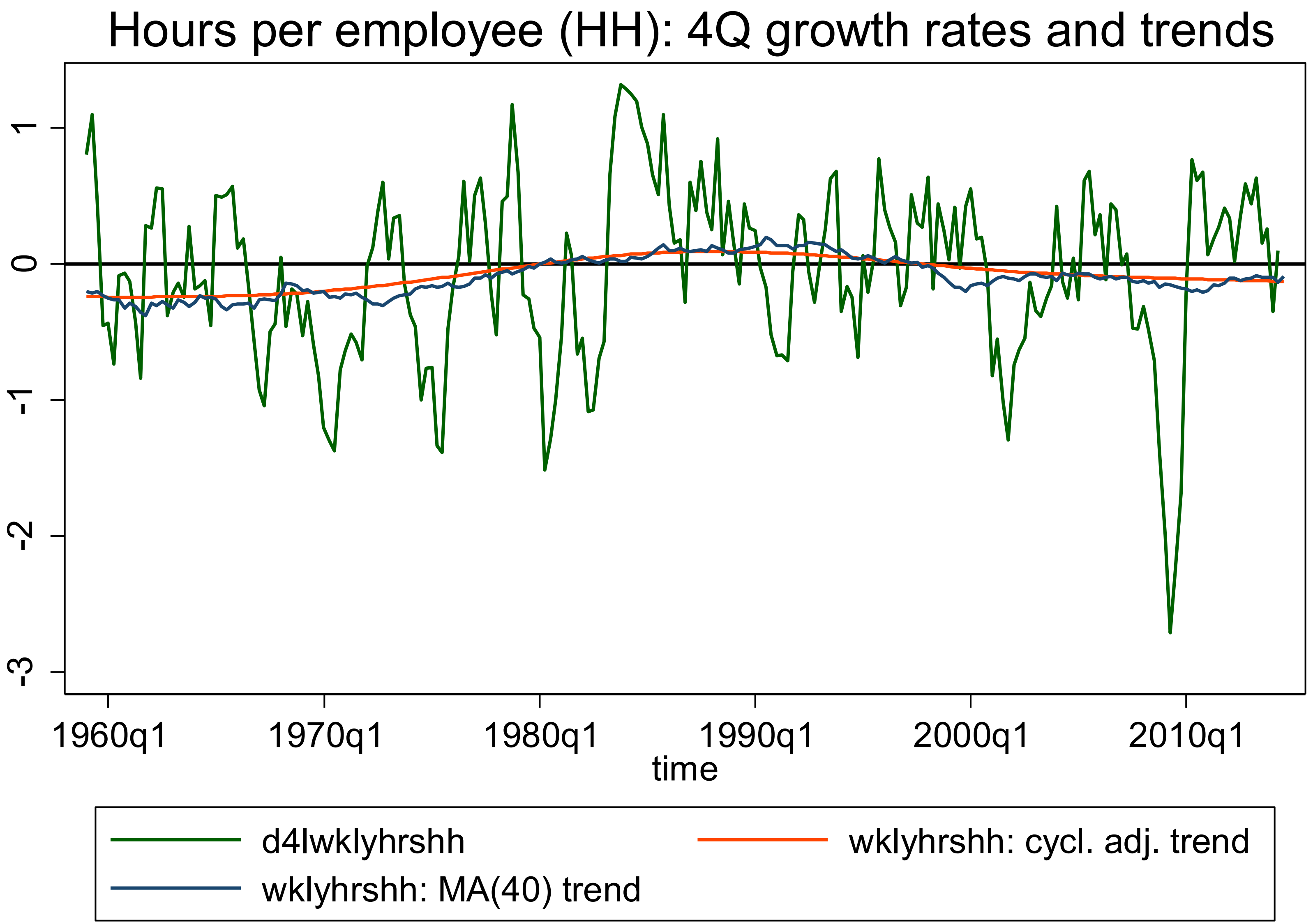
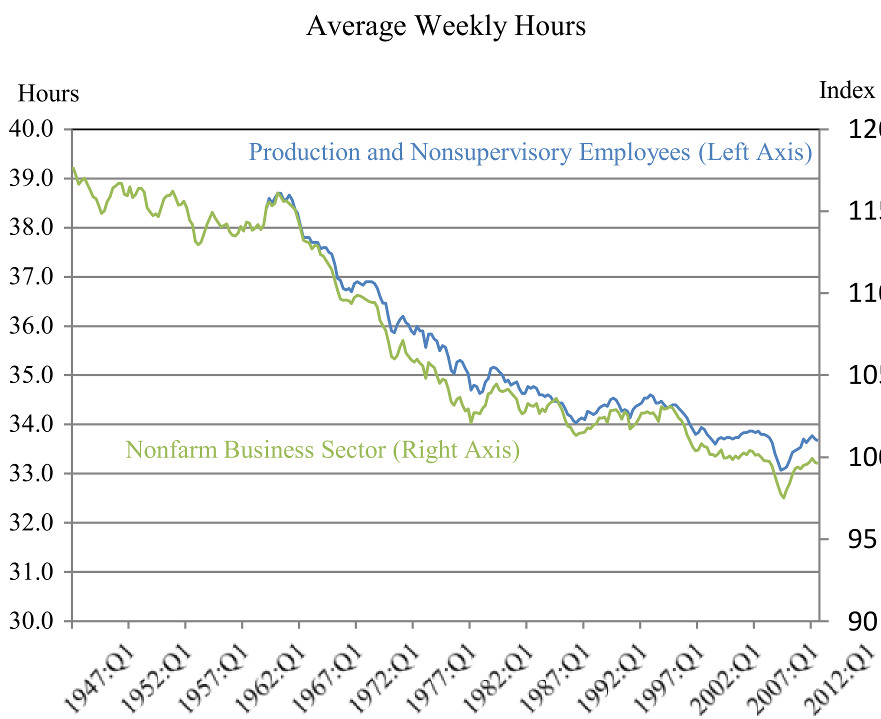
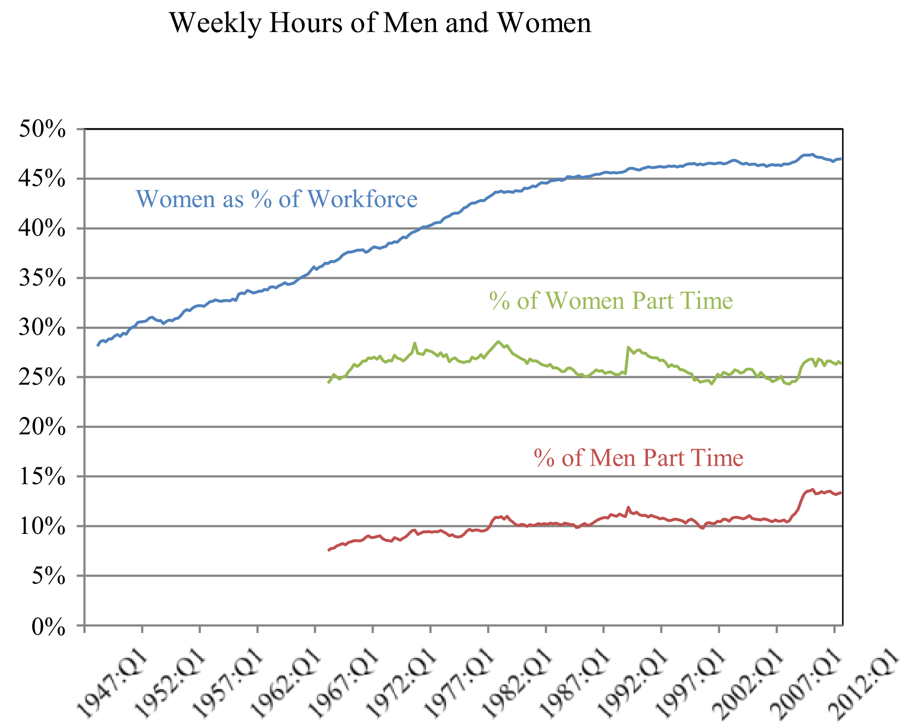


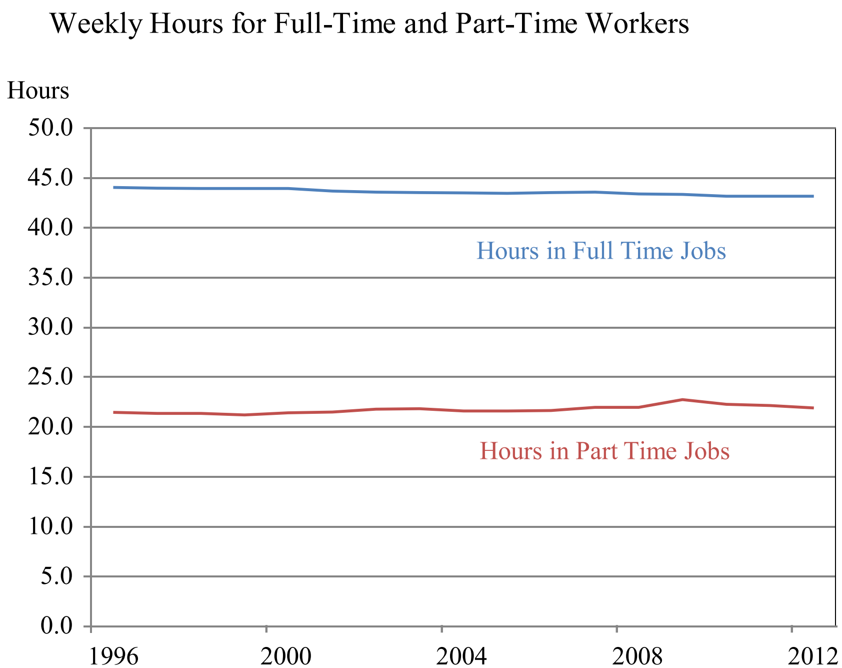
Weekly Hours

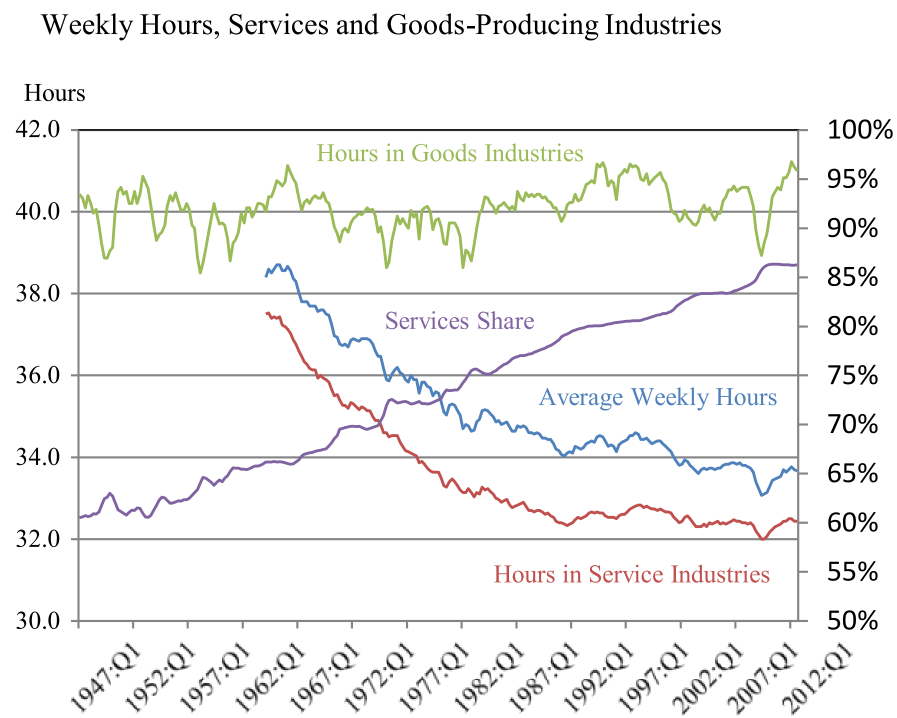




- Overall weekly hours fell during the 1970s, have fallen less since then
- Shift-share decomposition suggests that the decline in hours is largely compositional
- Women work part-time more than men – both shares are fairly stable – and entered the workforce strongly in the 1970s, with a plateau around 2000

Weekly Hours





- Full-time and part-time hours have remained remarkably steady
- There has also been a shift from goods-producing industries (with hours around 40) to services (with lower hours, around 32.5 since the mid-80s.

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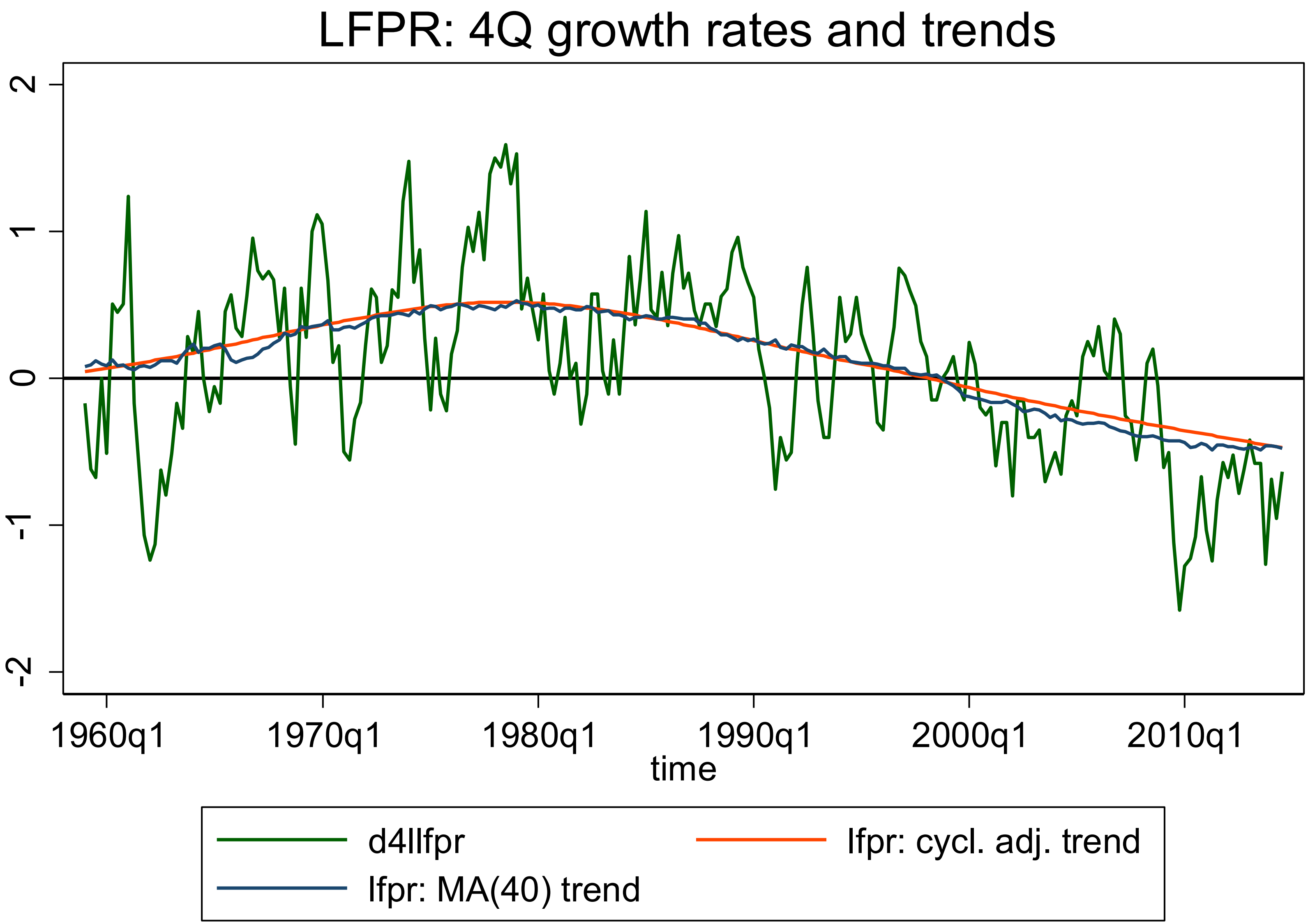
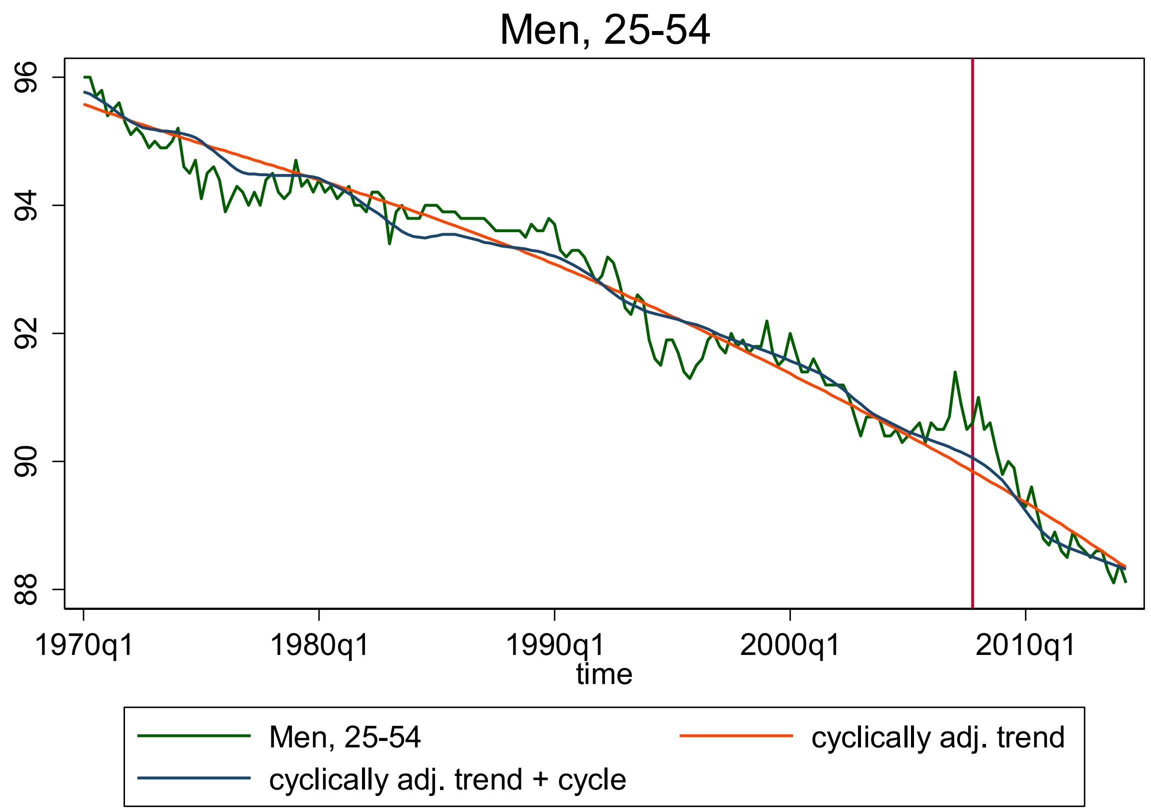


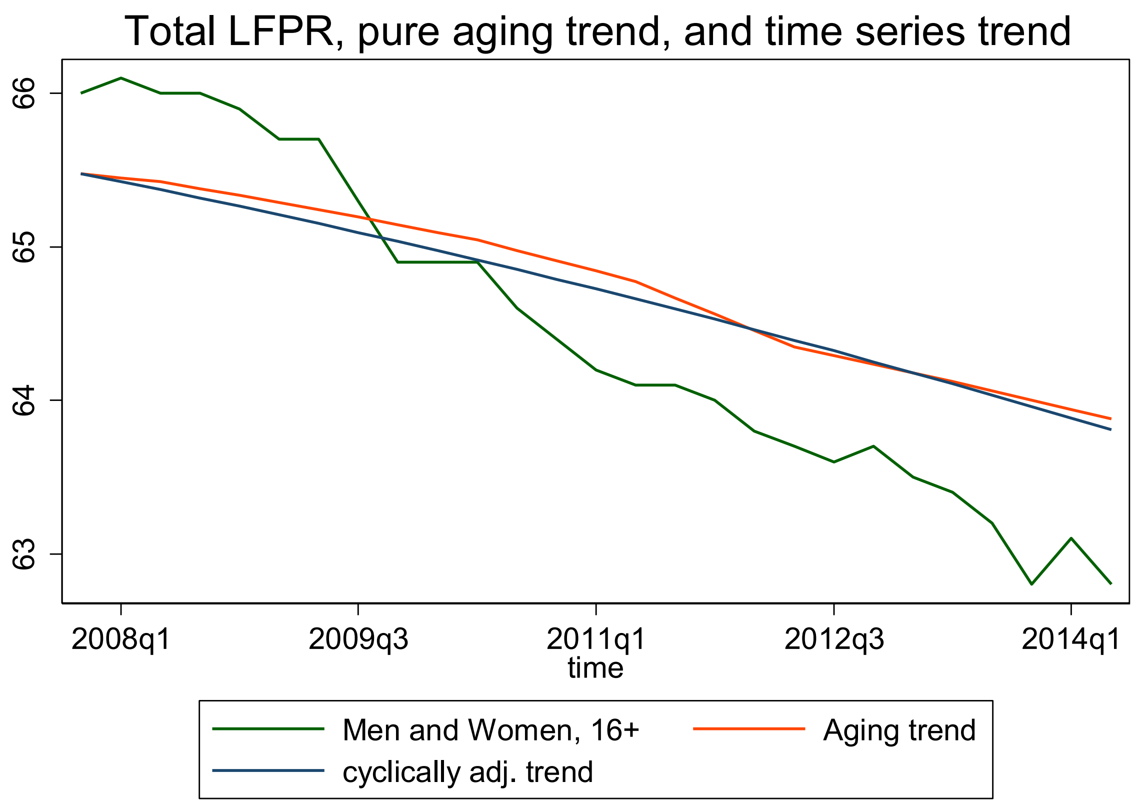
LFPR for men ages 25-54 (levels)

- For men, the downward decline in the LFPR has been ongoing for decades – that isn't an aging effect
- Cyclical LFPR movements for men 25-54 are quite small
- The decline for women now matches the decline for men
- A key question is whether this preexisting non-aging trend decline will continue, on top of the aging effect?



LFPR since 2007q4 (levels)

- Currently, the dominant trend is the retirement of the Baby Boom
- The pure aging effect can be calculated by holding the 2007 age profile constant and letting the population age (i.e. retire at historically normal rates)
- The pure aging trend and the time series trends are virtually identical



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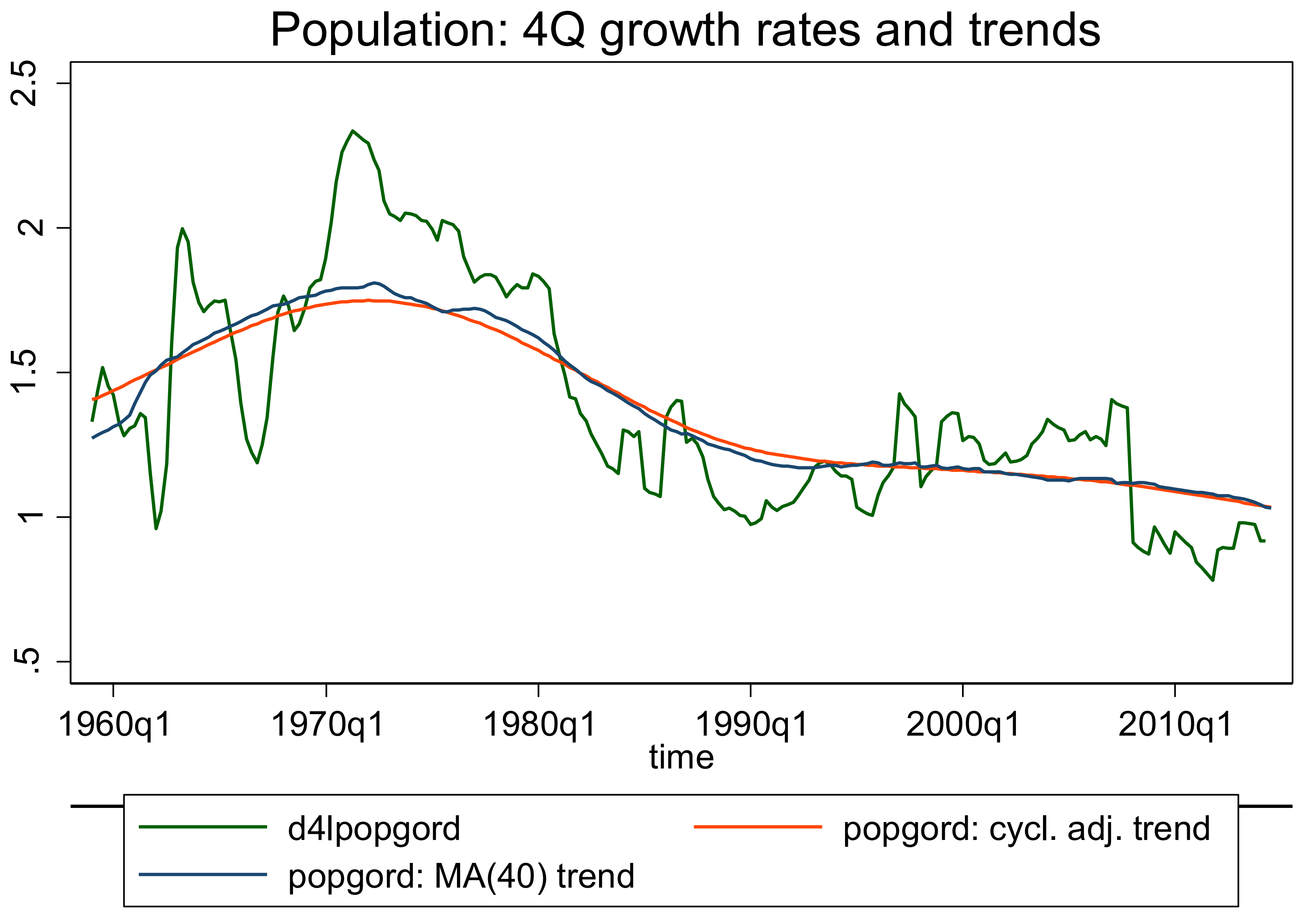

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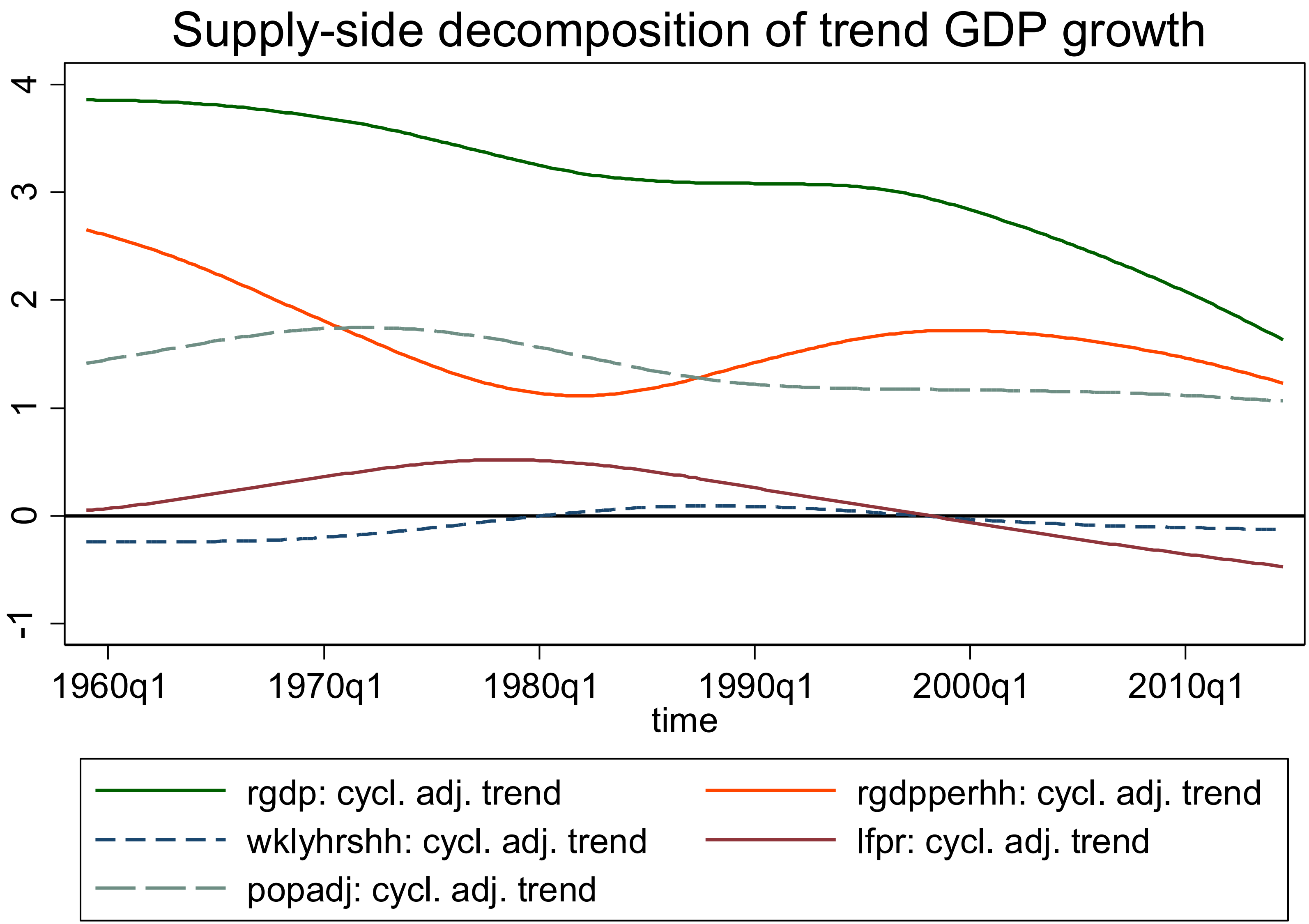
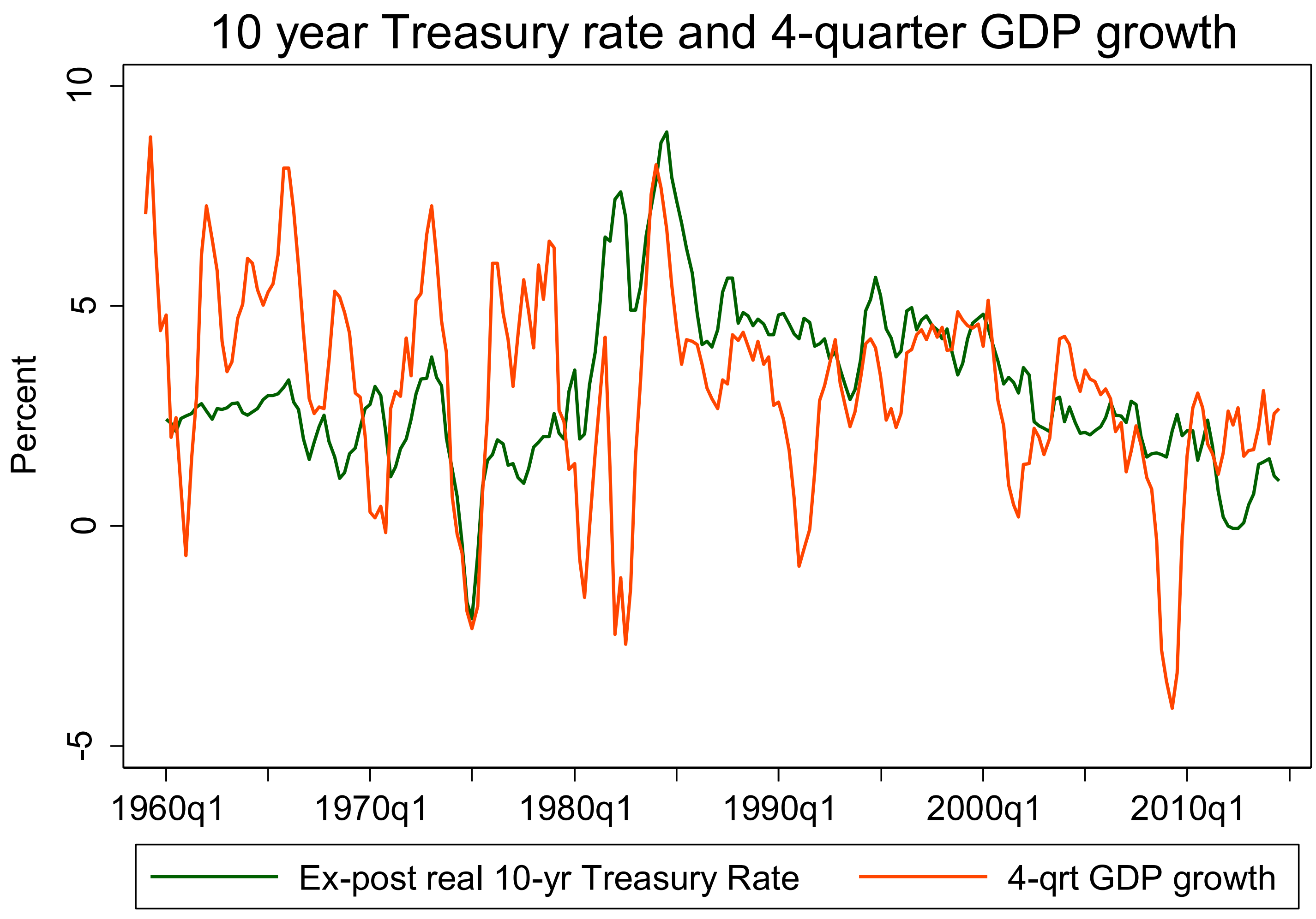
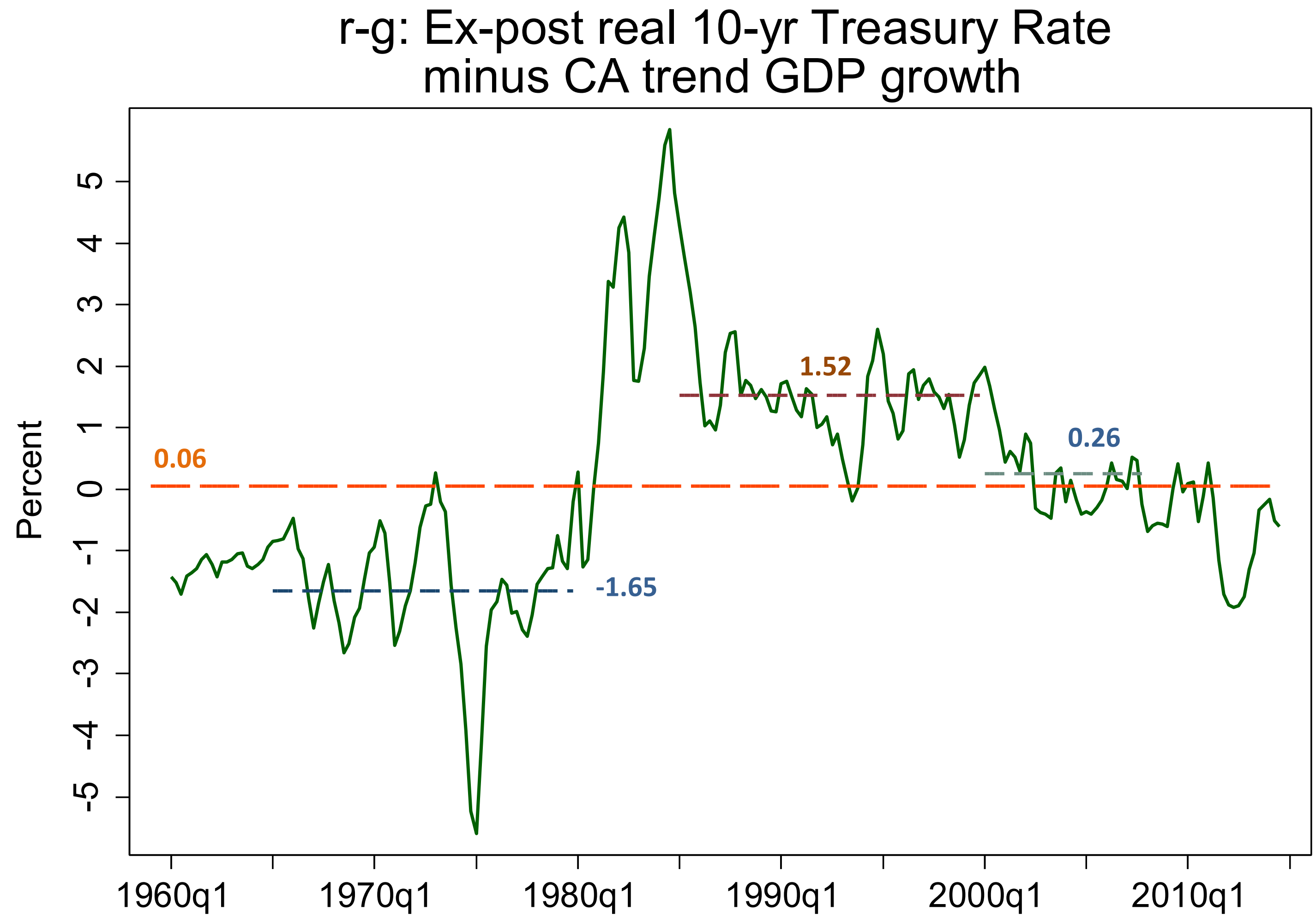


r-g



- Since 1985, the 10-year Treasury rate has followed the decline in real GDP growth
- Both series are noisy and cyclical…

r-g



- During the late 60's and 70's, inflation forecasts were too low
- During the late 80's and 90's, inflation forecasts were too high
- During 2000-2007, inflation forecasts were right on average and r-g averaged ~0
- This points to r-g close to zero; the post-1960 average is 0.06
- A decline in g of 0.9pp since 1995 corresponds to a comparable decline in r